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ABSTRACT

Educational videodiscs can provide effective instruction, but the cost of hardware needed to perform the desired system functions have been a limiting factor in videodisc use in the classroom. However, many videodisc applications can be adequately and effectively approached with much less than the ideal system, and very little attention has been given to maintaining an effective, inexpensive system. A basic level 1 system--consisting of a videodisc player with a handset for interaction and a standard television monitor--can be extremely effective when coupled with a well conceived lesson. For example, a videodisc of the opera "La Boheme" is available that can be used with an index developed by the University of Delaware to introduce students to the musical concepts in the score. While this interaction can be accomplished without computer control, it can also be easily upgraded to a level 3 system with computer control. The University of Maine has also developed study guides to accompany the compact disc of an orchestral work, Tchaikovsky's "Romeo and Juliet." An index provides a list of significant locations than can be randomly accessed by the videodisc player as well as identifying main themes and many other musical events. Again, the index information can be used to create a lesson without the use of a computer, or can be easily upgraded to use a level 3 system with a computer. Two equipment references and eight journal articles are listed. (EW)

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USING INTERACTIVE LASERDISCS:

INEXPENSIVE TEACHING TOOLS FOR THE CLASSROOM

Paper submitted by Ed Schwartz for INFOMART 1987

ABSTRACT

Educational videodiscs have been proven to be a significant factor in the effectiveness of education[1]. Currently, hundreds of videodiscs can be purchased in a wide variety of subject matter and in a wide price range[2]. The Institute for the Transfer of Technology to Education of the National School Boards Association suggests a number of reasons why schools should seriously consider using videodiscs[3]. One of the limiting factors of the technology has traditionally been the cost of the hardware needed to perform the desired system functions. This limiting factor can be overcome with inexpensive hardware and methods that can be effectively implemented in the classroom.

INTRODUCTION

The educational applications of the videodisc technology were highly touted from the early days of the technology. It was clear that the technology did offer many of the standard features that were highly desirable for educational settings. Research studies of the effectiveness of the videodisc have demonstrated that the technology is more effective than traditional teaching methods[4]. As the technology has matured, these applications have continued to grow. Today, there is not much that can't be

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done with the technology if the money is available to develop the hardware configuration and software programs.

It is obvious that not all educational institutions can afford the cost of the hardware, much less the software, due to budgetary constraints. It is, however, not always obvious that many of the most useful applications can be adequately and effectively approached with much less than the ideal system. There has been a tremendous amount of emphasis placed on all of the educational applications with the ideal system, or the system capable of the ultimate potential of the technology. On the other hand, very little attention has been given to maintaining an effective, inexpensive system.

THE IDEAL LEVEL 3 SYSTEMS

The ideal system is different for everyone, but a level 3 system[5] (a system with an external computer controlling the videodisc player) that has most of the common hardware needs is being implemented by the Army with their EIDS (Electronic Information Delivery System) contract. The Army is spending $223,460,000 over the next five years to put 47,900 interactive videodisc stations in active and reserve units around the world. There is little doubt that the Army has a high degree of confidence in the videodisc technology and that this system will surely become the standard for interactive videodisc systems in the near future. It currently consists of the following hardware:

1. An IBM-PC, AT compatible computer;

2. MS-DOS release 3.2 operating system;
3. Dual 720Kbyte floppies;
4. 20, 40, or 80Mbyte hard disk;
5. 12" optical laserdisc;
6. Graphic overlay for RGB or NTSC single-monitor display;
7. Sound-over-still and digital compressed audio;
8. Extended EGA graphics: 720 x 480;
9. Multiple input device support (keyboard, mouse, joystick, trackball, keypad, lightpen, touchscreen, modem, and tablet).

This set of features can provide more than enough flexibility for all but the most exotic applications. It would take a great deal of thought and imagination, not to mention programming, for someone to take advantage of all of these features effectively in one program. Each application dictates hardware needs and most applications can be effective with a basic system that has fewer features than the EIDS standard.

THE BASIC LEVEL 1 SYSTEM

The basic level 1 system is normally a videodisc player with a handset for interaction and a standard television receiver. Although the level 1 system might seem too basic, it can be extremely effective when coupled with a well conceived lesson, as will be described later in this discussion.

The level 1 system can later be augmented with additional hardware that would be appropriate to specific applications. Hardware such as a computer, alternate input devices and graphic overlay can be added, as the budget allows, to upgrade the system to level 3, but initially most of these functions can be developed inexpensively with just a videodisc player and a television set.

BACK TO BASICS

To look at the most basic interaction of the videodisc, the random search capability, one can argue that it is possibly the most useful feature of the technology. Although it is clear that the real power of the technology is the combination of this feature with the dense storage of still frames, one cannot make efficient use of the still frames without being able to access them easily. As the usefulness of still images in instruction are clearly evident, the focus of the discussion will be directed toward the random search in other than still frame applications. The two applications that will be discussed will be that of the motion video database and the audio database applications.

Possibly one of the most misunderstood applications is the use of the Extended Play (or CLV) videodiscs. Most educators do not look at the CLV videodiscs as an appropriate tool in the classroom because of the lack of its ability to produce still frames. In many applications, however, still frames are not completely necessary. In addition, the CLV discs are

normally consumer discs that are much less expensive than those videodiscs that were developed specifically for education. It is not being suggested that educational videodiscs should be created in the CLV format. In fact, it was stated earlier that the combination of several features (including still images) comprise the real power of the medium. It is being suggested, however, that the existing CLV videodiscs offer a very rich resource for the classroom teacher at very low cost.

INTERACTIVE CLV AND INTERACTIVE CD

Using the inexpensive CLV discs requires one important component. That is, a videodisc player that allows the maximum amount of flexibility with CLV interaction. Oddly enough, the most flexible player for this purpose is a consumer player (not a higher priced industrial model) that is produced by Pioneer Electronics. In addition to all of the standard features available in the CAV format, the CLD-909 videodisc player will search to any second location on a CLV format videodisc pressed after 1984. The player will also perform all of the CLV interactions with the Compact Audio Disc (CD) format and has a computer port that will allow all of the CAV, CLV and CD interactions to be computer controlled.

What does this mean to the classroom teacher? The main point is that commercial products exist, and that inexpensive discs and an inexpensive player can be controlled by a computer with easy to use software. How can these inexpensive commercial discs be effective in the classroom?

LA BOHEME, AN INEXPENSIVE CLV VIDEODISC

The videodisc of the opera ***La Bohème***[6] serves as a good example of the interactive possibilities of the CLV format discs. The list price of the ***La Bohème*** videodisc is $49.95, which is about what it would cost for one person to see the performance live. For this low cost, an entire class can experience the performances of such world-class singers as Teresa Stratas and José Carreras. It is invaluable for those who are not fortunate enough to live near a world-class opera house.

The University of Delaware has been involved in a ongoing project that will be identifying those commercial musical offerings on videodisc such as ***La Bohème*** that will be of importance in the music classroom, and developing an index for those discs that will assist the educator in using the discs effectively. The index is basically a running list of the contents for each of the locations that can be random accessed by the videodisc player. Of course, there are many musical concepts that are identified within the index as well. The students are introduced to the material in one of the newly equipped computerized videodisc classrooms in the music building. The University of Delaware main library and music library have videodisc equipment and software available to students for further individual and group study. A segment from the index in Figure 1, shows some of the concepts that are addressed.

RUNNING LIST OF TIMES FOR La Bohème
Side 1 - ACT I

TIME	CONTENTS	TIME	CONTENTS
	Side 1	01:09	Measure 8
		01:10	Measure 9
00:00	CHAPTER 0		Measure 10
	CREDITS	01:11	Measure 11
00:58	Title ACT I	01:12	Measure 12
	A garret		Measure 13
01:00	--------	01:13	Measure 14
		01:14	Measure 15
01:03	CHAPTER 1		Measure 16
Tempo	Allegro Vivace	01:15	Measure 17
01:05	Measure 1		Measure 18
#1	Bohemian's th.	01:16	Measure 19
	Measure 2		Measure 20
01:06	Measure 3	01:17	Measure 21
01:07	Measure 4	01:18	Measure 22
	Measure 5		Measure 23
01:08	Measure 6	01:19	Measure 24
	Measure 7	01:20	Measure 25

Figure 1

The following worksheet in Figure 2, demonstrates the use of this index information to create a lesson without the use of a computer. Notice that the interaction that is being accomplished with the handset can easily be done with a computer. The fact is, once a lesson has been developed for a basic level 1 system, it is very easy to upgrade the lesson to a level 3 system with computer control.

OPERA LESSON

EXERCISE #1 - Theme Identification
Look at the first ten bars of the Opera in your score. This music is normally associated with the Bohemians or the Bohemians' Theme. The first four bars are fragments of the main theme at measure 5. **PRESS TIME** and enter **1:05** to hear this theme. **PRESS SEARCH** to start and **PRESS PAUSE** to stop. Play this theme a few times until you are familiar with it.

Without looking at the score, try to identify another entrance of the Bohemians' Theme. **PRESS DISPLAY** to show the clock then **PRESS TIME** and enter **1:25** to begin the exercise. **PRESS SEARCH** to start and **PRESS PAUSE** to stop.

Write down the time location of the entrance and try again to see if you hear the theme at the same time location.

Figure 2

ROMEO AND JULIET, AN INEXPENSIVE COMPACT DISC

The compact disc of the orchestral work ***Romeo and Juliet***[7] serves as a good example of the interactive possibilities of the CD format discs. The list price of the ***Romeo and Juliet*** videodisc is $16.95, which again is about what it would cost for one person to see the performance live.

The University of Maine has been involved in a ongoing project that will be identifying those CD offerings such as this disc, and developing an study guide[8] for several discs that will assist the educator in using the discs effectively. As in the Delaware index, it is a list of significant locations that can be random accessed by the videodisc player. All of the main themes are identified along with many other musical events with their

function in the music. The students are introduced to the materials in class with a mobile videodisc workstation. The University of Maine has videodisc players and software available in several campus locations for further individual or group study. A segment from the Maine study guide appears in Figure 3.

Tchaikovsky: Overture-Fantasy Romeo and Juliet (1869 revised 1880)
Cleveland Orch., Lorin Maazel: Telarc CD-80068, DIDZ-10025, 1981.
Use CD #24 in the University of Maine library.

Key:	B minor
Meter:	four-four
Instrumentation:	Piccolo, 2 Flutes, 2 Oboes, 2 Clarinets, English Horn, 2 Bassoons, 2 Trumpets, 4 Horns, 3 Trombones, Tuba, 3 Timpani, Cymbals, Bass Drum, Harp, and Violin, Viola, Cello, Double Bass sections.
Form:	Sonata-Allegro form with intro. and coda

INTRODUCTION: (Friar).
Tempo: Andante non tanto quasi Moderato

00:00	1. Chorale: clarinets and bassoons suggest the sound of the organ; theme reused in the composition.
00:33	2. Strings and horn create foreboding atmosphere; harp arpeggios 01:24.
01:54	3. String's pizzicato accompanies woodwind chorale 02:01.
02:28	4. Restatement of the foreboding atmosphere with modified orchestration; contrary motion 03:03; harp arpeggios 03:24.

Figure 3

The worksheet in Figure 4 demonstrates the use of this index information to create a lesson without the use of a computer. Again, the interaction that is being accomplished with the handset can easily be done with a computer.

ORCHESTRA LESSON

EXERCISE #1 - Instrument Identification
Listen to the first 33 seconds of the music. This music is like a chant and intended to be the music for Friar Laurence. PRESS TIME and enter :00, then PRESS SEARCH to go to this music. PRESS PAUSE to start and PRESS PAUSE to stop. Play this theme a few times until you are familiar with it.

Now write down the family of instruments that you think is playing the chant music. PRESS TIME and enter :00, then PRESS SEARCH go to the music. PRESS PAUSE to start and PRESS PAUSE to stop.

Figure 4

CONCLUSION

The low cost of the level 1 systems and the commercial off-the-shelf software emphasize the fact that these optical technologies are very affordable by even the schools with little money. With the level 1 system as a beginning, a low cost interface can be purchased for under $100 from Visual Database Systems that will allow computer control.

The proven effectiveness of the technology also underlines the importance of the integration of the technology into classrooms across the

country. It is a technology that must not be ignored. The examples discussed are only small sample of the exciting kinds of interaction possible with discs that were previously ignored because of their assumed lack of interactive possibilities. As the use of videodiscs continue to grow in education, there will be more discs produced specifically for the educational setting. There is, however, a wealth of consumer materials currently available that can meet many of the needs of education until content-specific educational materials become as common as computer programs in the schools.

EQUIPMENT REFERENCES

The CLD-909 Videodisc Player is available through Pioneer Electronics, 200 West Grand Avenue, Montvale, NJ 07645.

The PC/LD Videodisc Interface is available through Visual Database Systems, 614 Bean Creek Road, Scotts Valley, CA 95066-3314.

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